BONE SCINTIGRAPHY IN CHILDREN WITH PERSISTENT PAIN IN AN EXTREMITY, SUGGESTING ALGONEURODYSTROPHY

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In this retrospective study, the data of bone scintigraphy performed in 21 children suspected of reflex sympathetic dystrophy (RSD) were analyzed. All of them had persistent pain in an extremity or a clinical suspicion of RSD. All children with strong suspicion of RSD showed diffuse hypoactivity at the level of the involved area on bone scintigraphy. This hypoactivity was clearly related to a decreased vascular supply. The specificity of this scintigraphic pattern is questionable, however, since two children without suggestive clinical signs for RSD had the same scintigraphic pattern.

Keywords : algoneurodystrophy ; reflex sympathetic dystrophy ; children ; bone scintigraphy.
Mots-clés : algoneurodystrophie ; dystrophie réflexe sympathique ; enfants ; scintigraphie osseuse.

INTRODUCTION

Algoneurodystrophy, or reflex sympathetic dystrophy (RSD), is an ill-defined pathology in pediatrics (2-6,8). The aim of this retrospective study was to analyze the Tc-99m methyldiphosphonate (MDP) bone scintigraphies in children suspected of RSD.

MATERIAL AND METHODS

Forty-two children with persistent pain in an extremity or a clinical suspicion of RSD and normal xrays were selected from a pediatric nuclear medicine database. Clinical criteria for the diagnosis of RSD were the following : presence of pain, swelling, vasomotor instability, temperature changes and hyperesthesia.

Bone scintigraphy was performed after injection of a dose of Tc-99m MDP according to the body size, and images were made with a one-headed camera. A two-phase study was completed, including early blood-pool images (static 1-min. images between 0 and 3 min. post injection) and 4-hour late images. Images were interpreted as having focal abnormalities or nonfocal abnormalities. The latter were again divided into hypo- and hyperactivity abnormalities.

RESULTS

Twenty-one patients were excluded because of an abnormal xray or for obvious local foci on scintigraphy such as infection, trauma or tumor. The 21 patients left had a mean age of 9.7 years, 18 were girls and 3, boys. Ages ranged from 1 to 14 years. We do not exclude the possibility that RSD was sometimes associated with these excluded cases ; however they were not analyzed in the present study. In 16 out of the 21 patients, bone scintigraphy was abnormal and was characterized by diffuse hypoactivity on late images of the painful limb. This hypoactivity was pronounced in 10 patients and less marked in the other 6. The scintigraphy was normal in 5 patients (table I). No cases of diffuse hyperactivity were observed. Pronounced hypoactivity was observed

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Table I. — Comparison between clinical picture and scintigraphic pattern

	Scintigraphy			
	pronounced hypoactivity	moderate hypoactivity	normal	total
Clinical picture (number of patients)				
Full picture	4	0	0	4
Incomplete picture	5	5	3	13
Not suggestive	1	1	2	4

Table II. — Comparison between blood pool images (early phase) and 4-hour late images

	Late images		
Early phase	pronounced hypoactivity	moderate hypoactivity	normal
Pronounced hypoactivity	9	1	1
Moderate hypoactivity	0	4	0
Normal	0	1	5

in all 4 cases highly suggestive of RSD ; among the 13 cases with an incomplete clinical picture, 10 showed scintigraphic hypoactivity (5 pronounced and 5 less marked) ; scintigraphy was normal in 3 cases. Among the 4 cases not suggestive of RSD, 2 also showed hypoactivity on late scintigraphic images (1 pronounced and 1 less marked), whereas scintigraphy was normal in 2 patients.

DISCUSSION

In this study bone scintigraphy showed a good relationship with the clinical symptoms of RSD. When there was a strong suspicion of RSD, bone scintigraphy showed hypoactivity in all cases. Bone scintigraphy alone cannot give the diagnosis of RSD. It is of value to confirm the diagnosis and in doubtful cases to have an argument in favor of or against RSD. Concerning bone scintigraphy itself, it appears that late 4-hour images reflect diminished vascular supply (table II). Also if we take into consideration the time elapsed between the first clinical symptoms and the scintigraphy, it is unlikely that, as in adult patients, a hyperactive scan had been present before development of hypocaptation of the tracer on bone scintigraphy (fig. 1).

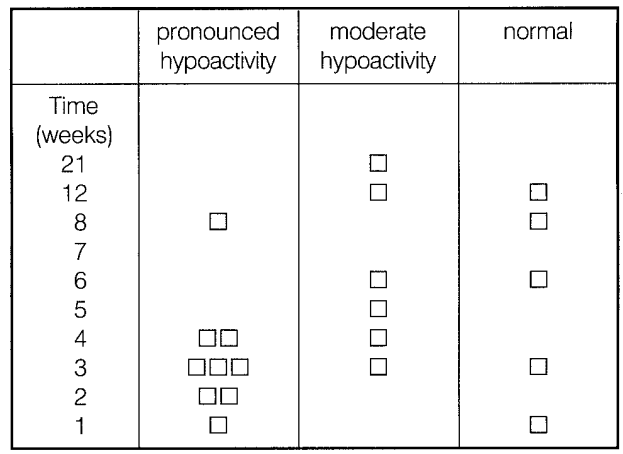

Fig. 1. — Comparison between blood pool images (early phase) and 4-hour late images.
It is presumed that in adults hypoactivity on a bone scan is only observed late in the evolution of the disease. Although not well understood, the pathophysiological mechanism responsible for the early development of hypoactivity in children seems different from what is observed in adults.

CONCLUSION

In a series of patients referred for clinical suspicion of RSD, we found a high frequency of hypoactivity on bone scintigraphy. This hypoactivity is likely related to decreased vascular supply

in this area and is probably not preceded by hyperactivity, as in adult RSD (1, 3, 7). The specificity of this abnormality is questionable however, since we found two patients with similar hypoactivity in whom the clinical symptoms were not suggestive of RSD.

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SAMENVATTING

C. F. OUD, J. LEGEIN, H. EVERAERT, H. DE BOECK, H. PINTELON, A. PIEPSZ. Botscintifrafie bij kinderen met blijvende pijn in een lidmaat een algodystrofie vermoedend.

In deze retrospectieve studie werd de botscintigrafie, uitgevoerd bij 21 kinderen, geanalyseerd. Allen hadden blijvende pijn en een klinisch vermoeden van RSD was aanwezig. Bij deze met een ernstig vermoeden toonde de botscintigrafie een hypo-activiteit ter hoogte van het getroffen gebied. Dit was waarschijnlijk gerelateerd aan een verminderde vasculaire toevoer. De specificiteit van deze scintigrafie blijft twijfelachtig gezien 2 kinderen zonder klinische tekens van RSD hetzelfde patroon vertoonden.

RÉSUMÉ

C. F. OUD, J. LEGEIN, H. EVERAERT, H. DE BOECK, H. PINTELON, A. PIEPSZ. La scintigraphie osseuse chez les enfants présentant une douleur persistante au niveau d'un membre, suggérant le diagnostic d'algoneurodystrophie.

Dans cette étude rétrospective, les résultats des scintigraphies osseuses réalisées chez 21 enfants présentant une suspicion de dystrophie réflexe sympathique ont été analysés. Tous les enfants présentaient une douleur persistante d'un membre, ou une suspicion clinique de dystrophie réflexe sympathique. Tous les enfants pour lesquels la suspicion était élevée démontraient à la scintigraphie une hypoactivité diffuse dans la région affectée. Cette hypoactivité était clairement liée à une diminution du débit sanguin. La spécificité de cette observation scintigraphique est toutefois discutable, en ce sens que dans notre expérience, deux enfants montraient le même tableau scintigraphique alors qu'ils ne présentaient aucun signe clinique évoquant le diagnostic d'algodystrophie.